

EXPEDITE

05/20/04

**MEMORANDUM**

**SUBJECT: REVISED. Methyldithiocarbamate salts, Metam-sodium, Metam-potassium, and Methyl isothiocyanate [MITC] PC Codes 039003, 039002, and 068103, respectfully. List B Reregistration Case 2390. Product Chemistry Chapter for the Reregistration Eligibility Decision [RED]. MRIDs 00162079-00162081, 41286001-41286003, 41241601-41241603, 42365601-42365603, 43457706-43457708, 43953901, 44453601-44453603, 44459101, 42165201, 44774401-44774405, and 45456501-45456510. DP Barcode D293330.**

**FROM:** K. Dockter, Chemist  
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**THRU:** Alan Nielsen, Branch Senior Scientist  
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**TO:** Carol Christensen, M.P.H., Risk Assessor  
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Attached is the RED document product chemistry chapter for metam-sodium, metam-potassium, and MITC. The chapter was assembled by Dynamac Corporation under the supervision of RRB2/HED. The data assessment has undergone secondary and tertiary review and has been revised to reflect Agency policies. Several product chemistry data requirements remain outstanding.

Attachment: RED Document: Product Chemistry Considerations

cc: RF, Dockter, C. Christensen, S. Kinard, S. Weiss.  
RD\I RRB2 metam-sodium/MITC RED Team.  
7509C:RRB2:Rm712N:57886:KD/kd  
50 = D293330.mem.

METHYLDITHIOCARBAMATE SALTS, METAM-SODIUM AND METAM-POTASSIUM

(Case No. 2390; PC Codes 039003 (Metam-sodium) and 039002 (Metam-potassium))

and

METHYL ISOTHIOCYANATE (MITC)

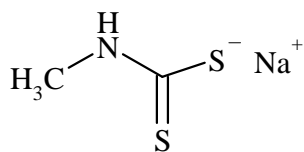
(Case No. 2405; PC Code 068103)

RED - REREGISTRATION ELIGIBILITY DECISION:

PRODUCT CHEMISTRY CONSIDERATIONS (DP Barcode D284271)

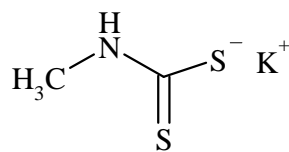
DESCRIPTION OF CHEMICAL

The sodium and potassium N-methyldithiocarbamate salts, [chemical group: carbamates/dithiocarbamates] metam-sodium and metam-potassium, are non-selective soil sterilants with fungicide, herbicide, insecticide, and nematicide properties. Metam-sodium and metam-potassium are presently registered as soil fumigants on a wide variety of crop groups including: root and tuber vegetables; bulb vegetables; leafy vegetables; Brassica (cole) leafy vegetables; legume vegetables; fruiting vegetables; cucurbit vegetables; citrus fruits; pome fruits; stone fruits; berries; tree nuts; cereal grains; nongrass animal feeds; and herbs and spices. Reregistration of metam-sodium is being supported by the Metam Sodium Task Force, which is currently comprised of UCB Chemical Corporation (Taminco, Inc.) and Tessenderlo Kerley, Inc.



Metam-sodium

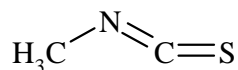
Empirical Formula:  $\text{C}_2\text{H}_4\text{NS}_2\text{Na}$   
Molecular Weight: 129.18  
CAS Registry No.: 137-42-8  
PC Code: 039003



Metam-potassium

Empirical Formula:  $\text{C}_2\text{H}_4\text{NS}_2\text{K}$   
Molecular Weight: 114.2  
CAS Registry No.: 137-41-7  
PC Code: 039002

MITC is a toxic degradant of metam-sodium and metam-potassium. Its mode of action is inactivation of sulfhydryl groups in amino acids.



Empirical Formula:  $\text{C}_2\text{H}_3\text{NS}$   
Molecular Weight: 73.12  
CAS Registry No.: 556-61-6  
PC Code: 068103

## IDENTIFICATION OF ACTIVE INGREDIENT

Pure metam-sodium is a white crystalline solid with a melting point of 86.5-90.5 C, density of 1.44 g/mL at 20 C, octanol/water partition coefficient (Log P)  $\leq$  -2.91, and vapor pressure of  $5.75 \times 10^{-2}$  Pa at 25 C. Solid metam-sodium is soluble in water at 578.29 g/L at 20 C, and in methanol (33-40 g/L), 1,2-dichloroethane ( $<0.2620$  g/L), xylene ( $<0.2611$  g/L), acetone ( $<0.2188$  g/L), n-heptane ( $<0.2126$  g/L), and ethyl acetate ( $<0.2032$  g/L). Aqueous formulations (42-44%) of metam-sodium have a boiling point of  $>100$  C, density of 1.25 g/mL at 25 C, octanol/water partition coefficient of 0.032 at 25 C, and vapor pressure of 16.5 mm Hg at 25 C. Metam-sodium is miscible with water and methanol, but is insoluble in most organic solvents, including chloroform, toluene, and aliphatic hydrocarbons. When mixed with water, metam-sodium hydrolyzes to MITC and carbon disulfide ( $\text{CS}_2$ ).

Aqueous formulations (54%) of metam-potassium are yellow to light yellow-green with possibility of an amine and sulfur odor have a boiling point of 108 C and density of  $1.3 \text{ g/cm}^3$  at 20 C. The vapor pressure is 24 mm of Hg at 25 C. The octanol/water partition coefficient of metam-potassium was not available. Metam-potassium is soluble in water, but is insoluble in mineral oil

MITC is a colorless crystalline solid with a melting point of 35-36 C, density of 1.07 g/mL at 37 C, octanol/water partition coefficient of 1.05 at 20 C, and vapor pressure of  $2 \times 10^4$  Pa. MITC is soluble in water (8.94 g/L at 20 C) and is freely soluble in alcohol and ether.

## MANUFACTURING-USE PRODUCTS

A search of the Reference Files System (REFS) conducted 3/13/03 identified seven manufacturing-use products (MPs) registered under PC Code 039003 (metam-sodium) and three MPs registered under PC Code 039002 (metam-potassium). In addition, a 42% end-use product, manufactured by an integrated system, is registered under PC Code 039003 (metam-sodium). No MPs are registered under PC Code 068103 (MITC). The registered metam-sodium and metam-potassium MPs/EPs to which a reregistration eligibility decision applies are listed in Table 1.

Because metam-sodium, metam-potassium, and MITC are List B chemicals, only the respective TGAIs are subject to a reregistration eligibility decision. Although the Agency typically requires data for the practical equivalent of the TGAI for FIs/EPs manufactured by integrated systems, in the case of the methyldithiocarbamate salts (metam-sodium and metam-potassium), a decision has been made to accept data for the aqueous formulation MPs/EPs because of difficulties encountered in producing and maintaining aqueous solutions containing higher concentrations of active ingredient.

Table 1. Registered Manufacturing-Use products of Methylthiocarbamate Salts (Case 2390).

Product	EPA Reg. No.	Registrant	Transfers	Comments
<b>Metam-sodium (039003)</b>				
42.5% FI	1448-107	Buckman Laboratories, Inc.		Data required to support the unregistered TGAI.
33% FI	1448-83			Formulated from an EPA-registered product; data requirements will be fulfilled by data for the source product (no data summary table).
44% FI	5481-469	Amvac Chemical Corporation	Transferred from Zeneca Ag (10182-399) 1/23/97	Data required to support the unregistered TGAI.
42% FI	5481-416			
42% FI	5481-421		Transferred from Transbas, Inc. (37507-4) 6/11/90	Formulated from EPA-registered products, data requirements will be fulfilled by data for the source products (no data summary table).
42% FI	34704-684	Platte Chemical Company, Inc.		Repackaged from EPA-registered products; data requirements will be fulfilled by data for the source products (no data summary table).
42% EP	45728-16	Taminco, Inc.	A division of UCB Chemicals Corporation	No data required..
42.2% FI	61842-4	Tessenderlo Kerley, Inc.	Transferred from: Sundance AG, Inc. (70166-4) 11/24/99 Oregon-California Chemicals, Inc. (52251-41) 12/22/97 BASF Corp. (7969-69) 11/20/91	Data required to support the unregistered TGAI.
<b>Metam-potassium (039002)</b>				
54% FI	1448-74	Buckman Laboratories, Inc.		Data required to support the unregistered TGAI.
20.3% FI	1448-382			Repackaged from an end-use product; data requirements will be fulfilled by data for the source product (no data summary table).
54% FI	5481-484	Amvac Chemical Corporation		Data required to support the unregistered TGAI.

## REGULATORY BACKGROUND

Additional product chemistry data in support of reregistration were required in the Methylthiocarbamate Salts Phase 4 Reviews, dated 5/13/91, by C. Olinger, for Buckman Laboratories (metam-sodium and metam-potassium), Transbas (metam-sodium) and Oregon-California Chemicals (metam-sodium), and in the MITC Phase 4 Reviews, dated 3/6/91, by C. Olinger, for Degussa Corporation and Nor-Am Chemical Company. Since publication of the Phase 4 Reviews, the Transbas metam-sodium product has been transferred to Amvac, the Oregon-California metam-sodium product has been transferred to Tessenderlo-Kerley. Data submitted subsequent to the Phase 4 Review have been reviewed by the Agency for all pertinent products.

Because MITC is a toxic metabolite of metam-sodium, the Agency has indicated that any MITC data generated in connection with metam-sodium products may be of interest in the reregistration of metam-sodium. In response, Taminco has submitted data pertaining to the UV/visible absorption, octanol/water partition coefficient, water solubility, and vapor pressure of MITC (MRID 45919402) in support of reregistration of their metam-sodium products. These data were reviewed by HED (D289774, K. Dockter).

The current status of the product chemistry data requirements in support of the metam-sodium and metam-potassium TGAIs is presented in the attached data summary tables. Refer to these tables for a listing of the outstanding product chemistry data requirements.

## CONCLUSIONS

All pertinent product chemistry data requirements are fulfilled for the Taminco unregistered metam-sodium TGAI. The outstanding product chemistry data requirements for the metam-sodium and metam-potassium MPs/EPs in support of the respective unregistered TGAIs are summarized in Table 2, and are detailed in the attached data summary tables.

Provided that the registrants submit the data required in the attached data summary tables for their TGAIs, and either certify that the suppliers of beginning materials and the manufacturing processes for the metam-sodium and metam-potassium FIs/EPs have not changed since the last comprehensive product chemistry reviews or submit complete updated product chemistry data packages, the Agency has no objections to the reregistration of the methylthiocarbamate salts with respect to product chemistry data requirements.

There are no toxic impurities stated in the jackets.

Table 2. Remaining Product Chemistry Data Requirements for Metam-sodium and Metam-Potassium MPs/EPs in Support of the Unregistered TGAIs.

Product	EPA Reg. No.	Registrant	OPPTS Guideline Requirements
<b>Metam-sodium (039003)</b>			
42.5% FI	1448-107	Buckman Laboratories, Inc.	830.7050
44% FI	5481-469	Amvac Chemical Corporation	830.6313, 7050, and 7840
42% FI	5481-416		
42% EP	45728-16	Taminco, Inc.	None
42.2% FI	61842-4	Tessenderlo Kerley, Inc.	830.1670, 1700, and 6313
<b>Metam-potassium (039002)</b>			
54% FI	1448-74	Buckman Laboratories, Inc.	830.1700, 6302, 6303, 6304, 6313, 7000, 7050, 7200/7220, 7300, 7370, 7550, 7840, and 7950
54% FI	5481-484	Amvac Chemical Corporation	830.6313, 7050, 7220, 7370, 7550, 7840, and 7950

Case No. 2390  
Chemical No. 039003

Case Name: Methyldithiocarbamate salts, metam-sodium  
Registrant: Buckman Laboratories, Inc.  
Product(s): 42.5% FI (EPA Reg. No. 1448-107)

#### PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? <sup>1</sup>	MRID Number <sup>2</sup>
830.1550	Product identity and composition	N/A <sup>3</sup>	
830.1600	Description of materials used to produce the product	Y	<b>41241601</b>
830.1620	Description of production process	Y	<b>41241601</b>
830.1670	Discussion of formation of impurities	Y	<b>41241601</b>
830.1700	Preliminary analysis	Y <sup>4</sup>	<b>41241602</b>
830.1750	Certified limits	N/A <sup>3</sup>	
830.1800	Enforcement analytical method	N/A <sup>3</sup>	
830.6302	Color	Y	<b>41241603</b>
830.6303	Physical state	Y	<b>41241603</b>
830.6304	Odor	Y	<b>41241603</b>
830.6313	Stability to normal and elevated temperatures, metals, and metal ions	Y	<b>41241603</b>
830.7000	pH	Y	<b>41241603</b>
830.7050	UV/Visible absorption	N <sup>5</sup>	
830.7200	Melting point/melting range	N/A <sup>6</sup>	
830.7220	Boiling point/boiling range	Y	<b>41241603</b>
830.7300	Density/relative density/bulk density	Y	<b>41241603</b>
830.7370	Dissociation constants in water	N/A	<b>41241603</b>
830.7550	Partition coefficient (n-octanol/water), shake flask method	Y	<b>41241603</b>
830.7840	Water solubility: column elution method; shake flask method	Y	<b>41241603</b>
830.7950	Vapor pressure	Y	<b>41241603</b>

<sup>1</sup> Y = Yes; N = No; N/A = Not Applicable. The Agency has agreed to accept data for the aqueous formulation manufacturing-use products (MPs) for TGAI data requirements for the methyldithiocarbamate salts because of difficulties encountered in producing and maintaining aqueous solutions containing higher concentrations of active ingredient.

<sup>2</sup> **Bolded** references were reviewed under a Registration Division Memorandum dated 6/10/91, A. Smith; and all other references were reviewed as noted.

<sup>3</sup> Product-specific data are not required.

<sup>4</sup> Preliminary analysis was conducted on the 42.5% product; components were quantitated down to 0.01% w/w. These data adequately reflect the composition of the unregistered TGAI.

<sup>5</sup> The OPPTS Series 830, Product Properties Test Guidelines require data pertaining to UV/visible absorption for the PAI.

<sup>6</sup> Data are not required because the 42.5% MP is a liquid at room temperature.

Case No. 2390  
Chemical No. 039003

Case Name: Methyldithiocarbamate salts, metam-sodium  
Registrant: Amvac Chemical Corporation  
Product(s): 44% FI (EPA Reg. No. 5481-469) and 42% FI (EPA Reg. No. 5481-416)

#### PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? <sup>1</sup>	MRID Number <sup>2</sup>
830.1550	Product identity and composition	N/A <sup>3</sup>	
830.1600	Description of materials used to produce the product	Y	<b>44453602</b>
830.1620	Description of production process	Y	<b>44453602</b>
830.1670	Discussion of formation of impurities	Y	<b>44453602</b>
830.1700	Preliminary analysis	Y <sup>4</sup>	<b>44453603</b>
830.1750	Certified limits	N/A <sup>3</sup>	
830.1800	Enforcement analytical method	N/A <sup>3</sup>	
830.6302	Color	Y	41286003 <sup>5</sup>
830.6303	Physical state	Y	41286003 <sup>5</sup> , 43457708 <sup>6</sup>
830.6304	Odor	Y	41286003 <sup>5</sup> , 43457708 <sup>6</sup>
830.6313	Stability to normal and elevated temperatures, metals, and metal ions	N <sup>7</sup>	41286003 <sup>5</sup>
830.7000	pH	Y	41286003 <sup>5</sup> , 43457708 <sup>6</sup>
830.7050	UV/Visible absorption	N <sup>8</sup>	
830.7200	Melting point/melting range	N/A <sup>9</sup>	
830.7220	Boiling point/boiling range	Y	41286003 <sup>5</sup>
830.7300	Density/relative density/bulk density	Y	41286003 <sup>5</sup> , 43457708 <sup>6</sup>
830.7370	Dissociation constants in water	Y	41286003 <sup>5</sup>
830.7550	Partition coefficient (n-octanol/water), shake flask method	Y	41286003 <sup>5</sup>
830.7840	Water solubility: column elution method; shake flask method	N <sup>10</sup>	41286003 <sup>5</sup>
830.7950	Vapor pressure	Y	41286003 <sup>5</sup>

<sup>1</sup> Y = Yes; N = No; N/A = Not Applicable. The Agency has agreed to accept data for the aqueous formulation manufacturing-use products (MPs) for TGAI data requirements for the methyldithiocarbamate salts because of difficulties encountered in producing and maintaining aqueous solutions containing higher concentrations of active ingredient.

<sup>2</sup> **Bolded** references were reviewed by the Registration Division under D242282, 1/28/98, S. Mathur for EPA Reg. No. 5481-469 and under D242281, 1/29/98, S. Mathur for EPA Reg. No. 5481-416; all other references were reviewed as noted.

<sup>3</sup> Product-specific data are not required.

<sup>4</sup> Preliminary analyses were conducted on the MPs as produced at two separate production facilities; components were quantitated down to 0.05% w/w. These data adequately reflect the composition of the unregistered TGAI.

<sup>5</sup> RD Memorandum, 11/1/90, A. Smith.

<sup>6</sup> RD Memorandum, 8/18/95, T. Alston.

<sup>7</sup> Quantitative data are required reflecting stability at normal and elevated temperatures and upon exposure to metals and metal ions.

<sup>8</sup> The OPPTS Series 830, Product Properties Test Guidelines require data pertaining to UV/visible absorption for the PAI.

<sup>9</sup> Data are not required because the 44% and 42% MPs are liquids at room temperature.

<sup>10</sup> Quantitative data are required reflecting solubility in water and representative organic solvents.



Case No. 2390  
Chemical No. 039003

Case Name: Methylthiocarbamate salts, metam-sodium  
Registrant: Taminco, Inc.  
Product(s): 42% EP (EPA Reg. No. 45728-16)

#### PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? <sup>1</sup>	MRID Number <sup>2</sup>
830.1550	Product identity and composition	N/A <sup>3</sup>	
830.1600	Description of materials used to produce the product	Y	<b>00162081</b>
830.1620	Description of production process	Y	<b>00162081</b>
830.1670	Discussion of formation of impurities	Y	<b>00162081</b>
830.1700	Preliminary analysis	Y	<b>00162080</b>
830.1750	Certified limits	N/A <sup>3</sup>	
830.1800	Enforcement analytical method	N/A <sup>3</sup>	
830.6302	Color	Y	<b>00162079</b> , 45919401 <sup>4</sup>
830.6303	Physical state	Y	<b>00162079</b> , 45919401 <sup>4</sup>
830.6304	Odor	Y	<b>00162079</b> , 45919401 <sup>4</sup>
830.6313	Stability to normal and elevated temperatures, metals, and metal ions	Y	<b>00162079</b>
830.7000	pH	Y	<b>00162079</b>
830.7050	UV/Visible absorption	Y	45919401 <sup>4</sup>
830.7200	Melting point/melting range	Y	45919401 <sup>4</sup>
830.7220	Boiling point/boiling range	N/A <sup>5</sup>	
830.7300	Density/relative density/bulk density	Y	<b>00162079</b> , 45919401 <sup>4</sup>
830.7370	Dissociation constants in water	Y	45919404 <sup>4</sup>
830.7550	Partition coefficient (n-octanol/water), shake flask method	Y	45919401 <sup>4</sup>
830.7840	Water solubility: column elution method; shake flask method	Y	45919401 <sup>4</sup> , 45919403 <sup>4</sup>
830.7950	Vapor pressure	Y	45919401 <sup>4</sup>

<sup>1</sup> Y = Yes; N = No; N/A = Not Applicable. Based on the CSFs available from the product jacket, the basic formulation and several alternate formulations are manufactured by an integrated system; therefore, product chemistry data are required to support the unregistered TGAI. The Agency has agreed to accept data for the aqueous formulation products for TGAI data requirements for the methylthiocarbamate salts because of difficulties encountered in producing and maintaining aqueous solutions containing higher concentrations of active ingredient; however, PAI data have been submitted for a solid metam-sodium.

<sup>2</sup> **Bolded** references were reviewed by the Registration Division, 3/15/89, A. Skapars for the 42% aqueous formulation; and all other references were reviewed as noted.

<sup>3</sup> Product-specific data are not required.

<sup>4</sup> D289771, D289776, and D289777, 8/11/03, K. Dockter.

<sup>5</sup> Data are not required because melting point data are available for a solid metam-sodium PAI.

Case No. 2390  
 Chemical No. 039003  
 Case Name: Methylthiocarbamate salts, metam-sodium  
 Registrant: Tessenderlo Kerley, Inc.  
 Product(s): 42.2% FI (EPA Reg. No. 61842-4)

### PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? <sup>1</sup>	MRID Number <sup>2</sup>
830.1550	Product identity and composition	N/A <sup>3</sup>	
830.1600	Description of materials used to produce the product	Y	<b>44459101</b>
830.1620	Description of production process	Y	<b>44459101</b>
830.1670	Discussion of formation of impurities	N <sup>4</sup>	
830.1700	Preliminary analysis	N <sup>5</sup>	
830.1750	Certified limits	N/A <sup>3</sup>	
830.1800	Enforcement analytical method	N/A <sup>3</sup>	
830.6302	Color	N	
830.6303	Physical state	N	
830.6304	Odor	N	
830.6313	Stability to normal and elevated temperatures, metals, and metal ions	N <sup>6</sup>	
830.7000	pH	N	
830.7050	UV/Visible absorption	Y	<i>45919401</i> <sup>7</sup>
830.7200	Melting point/melting range	Y	<i>45919401</i> <sup>7</sup>
830.7220	Boiling point/boiling range	N/A <sup>8</sup>	
830.7300	Density/relative density/bulk density	N	
830.7370	Dissociation constants in water	Y	<i>45919404</i> <sup>7</sup>
830.7550	Partition coefficient (n-octanol/water), shake flask method	Y	<i>45919401</i> <sup>7</sup>
830.7840	Water solubility: column elution method; shake flask method	Y	<i>45919401</i> <sup>7</sup> , <i>45919403</i> <sup>7</sup>
830.7950	Vapor pressure	Y	<i>45919401</i> <sup>8</sup>

<sup>1</sup> Y = Yes; N = No; N/A = Not Applicable. The Agency has agreed to accept data for the aqueous formulation manufacturing-use products (MPs) for TGAI data requirements for the methylthiocarbamate salts because of difficulties encountered in producing and maintaining aqueous solutions containing higher concentrations of active ingredient; however, PAI data have been submitted for a solid metam-sodium. The Tessenderlo Kerley 42.2% FI was transferred from Sundance AG (EPA Reg. No. 70166-4), formerly Oregon-California Chemical, Inc. (EPA Reg. No. 52251-41), and was originally registered to BASF (EPA Reg. No. 7969-69). Based on the available data, the basic manufacturing process and location changed with the original transfer to Oregon-California and have not changed since.

<sup>2</sup> **Bolded** references were reviewed by the Registration Division under D243293, 3/4/98, S. Mathur; and all other references were reviewed as noted. *Italicized* references reflect acceptable PAI data for phys/chem requirements which may be shared by the Metam Sodium Task Force members.

<sup>3</sup> Product-specific data are not required.

<sup>4</sup> Additional discussion of the potential for formation of post-production impurities is required, including: (i) possible degradation of ingredients in the product; (ii) postproduction reactions between ingredients; (iii) migration of packaging material components into the product; and (iv) carryover of contaminants from use of production equipment to produce other products. In addition, if any other impurities are identified in the required preliminary analysis, additional information will be required.

<sup>5</sup> Analysis of five batches of the product as produced at the current production site are required. Components must be quantitated down to 0.05% to be representative of the TGAI, and method descriptions with supporting validation data must be included.

<sup>6</sup> Data are required demonstrating the stability of metam-sodium upon exposure to metals and metal ions.

<sup>7</sup> D289771, D289776, and D289777, 8/11/03, K. Dockter (data for the Taminco metam-sodium solid PAI).

<sup>8</sup> Data are not required because melting point data are available for a solid metam-sodium PAI.

Case No. 2390  
 Chemical No. 039002

Case Name: Methyldithiocarbamate salts, metam-potassium  
 Registrant: Buckman Laboratories, Inc.  
 Product(s): 54% FI (EPA Reg. No. 1448-74)

#### PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? <sup>1</sup>	MRID Number <sup>2</sup>
830.1550	Product identity and composition	N/A <sup>3</sup>	
830.1600	Description of materials used to produce the product	Y	<b>43953901</b>
830.1620	Description of production process	Y	<b>43953901</b>
830.1670	Discussion of formation of impurities	Y	<b>43953901</b>
830.1700	Preliminary analysis	N	
830.1750	Certified limits	N/A <sup>3</sup>	
830.1800	Enforcement analytical method	N/A <sup>3</sup>	
830.6302	Color	N	
830.6303	Physical state	N	
830.6304	Odor	N	
830.6313	Stability to normal and elevated temperatures, metals, and metal ions	N	
830.7000	pH	N	
830.7050	UV/Visible absorption	N	
830.7200	Melting point/melting range	N	
830.7220	Boiling point/boiling range	N	
830.7300	Density/relative density/bulk density	N	
830.7370	Dissociation constants in water	N	
830.7550	Partition coefficient (n-octanol/water), shake flask method	N	
830.7840	Water solubility: column elution method; shake flask method	N	
830.7950	Vapor pressure	N	

<sup>1</sup> Y = Yes; N = No; N/A = Not Applicable. The Agency has agreed to accept data for the aqueous formulation manufacturing-use products (MPs) for TGAI data requirements for the methyldithiocarbamate salts because of difficulties encountered in producing and maintaining aqueous solutions containing higher concentrations of active ingredient.

<sup>2</sup> **Bolded** references were reviewed by the Registration Division under D224833, 4/26/96, A. Skapars.

<sup>3</sup> Product-specific data are not required.

AGENCY MEMORANDA CITED IN THIS DOCUMENT

DP Barcode(s): RD Memorandum; None  
Subject: Product Chemistry Review of Metam Sodium 42% Technical (EPA I.D. No. 5481-URA).  
From: A. Smith  
To: S. Lewis  
Dated: 11/1/90  
MRID(s): 41286001-41286003

DP Barcode(s): RD Memorandum; None  
Subject: Product Chemistry Review of Metam Concentrate (EPA File Symbol 1448-RNT).  
From: A. Smith  
To: S. Lewis  
Dated: 6/10/91  
MRID(s): 41241601-41241603

DP Barcode(s): D180464  
Subject: Reregistration of Methyl Isothiocyanate (MITC). Degussa Product Chemistry Considerations. Rereg. Case # 2405; Chemical# 68103.  
From: K. Dockter  
To: B. Briscoe/E. Mitchell  
Dated: 9/29/92  
MRID(s): 42365601-42365603

DP Barcode(s): RD Memorandum; None  
Subject: Product Chemistry Review; EPA File Symbol 10182-GOO.  
From: T. Alston  
To: C. Welch  
Dated: 8/18/95  
MRID(s): 43457706-43457708

DP Barcode(s): RD Memorandum; D224833  
Subject: Product Chemistry Review of a Manufacturing-Use Product; Reg. No. 1448-74.  
From: A. Skapars  
To: M. Johnson/M. Terry  
Dated: 4/26/96  
MRID(s): 43953901

DP Barcode(s): RD Memorandum; D242282  
Subject: Product Chemistry Review of MP; Reg. No. 5481-469; Product Name: Metam Manufacturing Use Concentrate; Company: AMVAC Chemical Corporation.  
From: S. Mathur  
To: M. Waller  
Dated: 1/28/98  
MRID(s): 44453601-44453603

DP Barcode(s): RD Memorandum; D242281  
Subject: Product Chemistry Review of MP; Reg. No. 5481-416; Product Name: Metam Manufacturing Use Concentrate; Company: AMVAC Chemical Corporation.  
From: S. Mathur  
To: M. Waller  
Dated: 1/29/98  
MRID(s): 44453601-44453603

DP Barcode(s): RD Memorandum; D243293  
Subject: Product Chemistry Review; Reg. No. 70166-4; Product Name: Metam Fluid Manufacturers Concentrate; Company: Sundance AG, Inc.  
From: S. Mathur  
To: M. Waller  
Dated: 3/4/98  
MRID(s): 44459101

DP Barcode(s): RD Memorandum; D276484  
Subject: Product Chemistry Review of Metam Potassium Manufacturing Use Concentrate. File Symbol 5481-UIU, Amvac Chemical Corporation.  
From: B. Kitchens  
To: M. Waller/M. Christian  
Dated: 8/6/01  
MRID(s): 42165201, 44774401-44774405, and 45456501-45456510

DP Barcode(s): D289774  
Subject: Product Chemistry Review of Metam Potassium Manufacturing Use Concentrate. File Symbol 5481-UIU, Amvac Chemical Corporation. Methyl isothiocyanate [MITC]. List B Reregistration Case 2405. PC Code 068103. Product Chemistry; 830.7950, .7050, .7840, & .7550.  
From: K. Dockter  
To: C. Christensen  
Dated: 5/28/03  
MRID(s): 45919402

DP Barcode(s): D289771, D289776, and D289777  
Subject: Metam-sodium. List B Reregistration Case 2390. PC Code 039003.  
Product Chemistry.  
From: K. Dockter  
To: C. Christensen  
Dated: 8/11/03  
MRID(s): 45919401, 45919403, and 45919404

### PRODUCT CHEMISTRY CITATIONS

Bibliographic citations include only MRIDs containing data which fulfill data requirements.

#### References (cited):

00162079 UCB Chemicals Corp. (1986) Physical and Chemical Characteristics: Series 63: Metam 42%. Unpublished compilation. 22 p.

00162080 UCB Chemicals Corp. (1986) Analysis and Certification of Products Ingredients: Series 62: Metam 42%. Unpublished compilation. 20 p.

00162081 UCB Chemicals Corp. (1986) Product Identity and Composition: Series 61: Metam 42%. Unpublished compilation. 25 p.

40401201 Morgan, D. (1987) Product Chemistry Data: Sodium N-methyldithiocarbamate. Unpublished compilation prepared by Oregon-California Chemical, Inc. 56 p.

41002102 Nelsen, T. (1989) Data Concerning the Physical and Chemical Characteristics of Metam-Sodium: Document No. BASF: 88/5136. Unpublished study prepared by BASF Aktiengesellschaft. 22 p.

41062901 Nelsen, T. (1989) The Analysis and Certification of Limits of Metam-sodium Manufacturers Use Product, Metam Fluid: BASF No. 88/5138. Unpublished study prepared by BASF Aktiengesellschaft. 74 p.

41241601 Bowles, D. (1989) Product Chemistry for Metam Concentrate: Project ID Metam. Unpublished study prepared by Buckman Laboratories International, Inc. 43 p.

41241602 Bowles, D. (1989) Product Chemistry for Metam Concentrate. Project ID Metam. Unpublished study prepared by Buckman Laboratories International, Inc. 42 p.

- 41241603 Bowles, D. (1989) Product Chemistry for Metam Concentrate: Project ID Metam. Unpublished study prepared by Buckman Laboratories International, Inc. 6 p.
- 41286003 Brady, K.; Feiler, W. (1989) Metam Sodium Technical: Physical and Chemical Characteristics. Unpublished study prepared by Amvac Chemical Corp. 3 p.
- 42165201 Watson, C. (1991) Product Chemistry for PNMD: Physical/Chemical Properties. Unpublished study prepared by Buckman Laboratories International, Inc. 24 p.
- 42365601 Walzer, E. (1991) Methylisothiocyanate (MITC): Product Identity and Composition. Unpublished study prepared by Degussa AG. 23 p.
- 42365602 Walzer, E. (1992) Methylisothiocyanate (MITC): Analysis and Certifications of Product Ingredients. Unpublished study prepared by Degussa AG. 22 p.
- 42365603 Walzer, E. (1992) Methylisothiocyanate (MITC): Physical and Chemical Characteristics. Unpublished study prepared by Degussa AG. 10 p.
- 43457708 Goodman, M. (1994) Metam Sodium--Physical/Chemical Studies on Pure and 42% Material (WF1694): Lab Project Number: RR 94-047B. Unpublished study prepared by Zeneca Ag Western Research Center. 25 p.
- 43540901 Werle, ?. (1994) Product Chemistry Data in Support of Reregistration Response for Methylisothiocyanate (MITC): Product Identity and Composition: Lab Project Number: HANAU 24.02.1994: IC-OC-AT/DR. WE-RE. Unpublished study prepared by Degussa AG. 11 p.
- 43540902 Werle, ?. (1994) Product Chemistry Data in Support of Reregistration Response for Methylisothiocyanate (MITC): Analysis and Certification of Product Ingredients: Lab Project Number: HANAU 24.02.1994: IC-OC-AT/DR. WE-RE. Unpublished study prepared by Degussa AG. 29 p.
- 43540903 Werle, ?. (1994) Product Chemistry Data in Support of Reregistration Response for Methylisothiocyanate (MITC): Physical and Chemical Characteristics: Lab Project Number: HANAU 24.02.1994: IC-OC-AT/DR. WE-RE. Unpublished study prepared by Degussa AG. 13 p.
- 43737101 Watson, C. (1995) Product Chemistry for Metam Concentrate: Supplement to Vol. 1 - Guidelines Series 61: Product Identity, Manufacturing Process, Discussion of Impurities. Unpublished study prepared by Buckman Labs, Inc. 46 p.
- 43953901 Roberts, T.; Watson, C. (1996) Product Chemistry for PNMD: Supplement. Unpublished study prepared by Buckman Laboratories Int'l., Inc. 62 p.
- 44453602 Heath, J. (1997) Raw Materials, Manufacturing Process and Formation of Impurities

in Metam Sodium Manufacturing Concentrate: Lab Project Number: JH 003. Unpublished study prepared by AMVAC Chemical Corp. 48 p.

44453603 Brady, K. (1997) Metam Sodium Manufacturing Concentrate: Preliminary Analysis: Lab Project Number: COMP 02401: DT-5: DT-3. Unpublished study prepared by AMVAC Chemical Corp. 138 p.

44459101 Boone, I. (1998) Product Chemistry for Metam Fluid Manufacturers Concentrate. Unpublished study prepared by Sundance Ag., Inc. 11 p.

44774401 Brady, K. (1998) Potassium N-Methyldithiocarbamate (Metam Potassium) Manufacturing Concentrate: Physical State: Lab Project Number: PHS 54001. Unpublished study prepared by AMVAC Chemical Corporation. 8 p.

44774402 Brady, K. (1998) Potassium N-Methyldithiocarbamate (Metam Potassium) Manufacturing Concentrate:pH: Lab Project Number: PH 54001. Unpublished study prepared by AMVAC Chemical Corporation. 15 p.

44774404 Brady, K. (1998) Potassium N-Methyldithiocarbamate (Metam Potassium) Manufacturing Concentrate: Density: Lab Project Number: DEN 54001. Unpublished study prepared by AMVAC Chemical Corporation. 11 p.

44774405 Brady, K. (1998) Potassium N-Methyldithiocarbamate (Metam Potassium) Manufacturing Concentrate: Preliminary Analysis: Lab Project Number: COMP 54001. Unpublished study prepared by AMVAC Chemical Corporation. 6 p.

45456502 Feiler, W.; Brady, K. (2001) Materials Used for Production of Metam Potassium Manufacturing Use Concentrate: Lab Project Number: RAW-11801. Unpublished study prepared by AMVAC Chemical Corporation. 54 p.

45456503 Feiler, W.; Brady, K. (2001) Production Process for Metam Potassium Manufacturing Use Concentrate: Lab Project Number: PRC-11801. Unpublished study prepared by AMVAC Chemical Corporation. 10 p.

45456504 Feiler, W.; Brady, K. (2001) Formation of Impurities: Metam Potassium Manufacturing Use Concentrate: Lab Project Number: IMP-11801. Unpublished study prepared by AMVAC Chemical Corporation. 10 p.

45456507 Brady, K. (2001) Metam Potassium Manufacturing Use Concentrate: Color: Lab Project Number: CLR 11801. Unpublished study prepared by AMVAC Chemical Corporation. 10 p.

45456508 Brady, K. (2001) Metam Potassium Manufacturing Use Concentrate: Odor: Lab Project Number: ODR 11801. Unpublished study prepared by AMVAC Chemical Corporation. 9 p.



45919401 Betteley, J. (1997) Metam Sodium Physicochemical Properties: Lab Project Number: FCC 152/963829: FCC/152. Unpublished study prepared by Huntingdon Life Sciences Ltd. 153 p.

45919402 Flack, I. (1997) Methyl Isothiocyanate: Physico and Chemical Properties: Lab Project Number: FCC 153/962827. Unpublished study prepared by Huntingdon Life Sciences Ltd. 69 p.

45919403 Betteley, J. (2002) Metam-Sodium: Solubility in Water (pH 5 and pH 9): Lab Project Number: UCB809/013754. Unpublished study prepared by Huntingdon Life Sciences, Ltd. 18 p.

45919404 Betteley, J. (2002) Metam-Sodium: Dissociation Constant: Lab Project Number: UCB810/013755. Unpublished study prepared by Huntingdon Life Sciences Ltd. 27 p.

